Project Report: Subglacial Sampling in Iceland

Project Investigator:	***Eric Gaidos***

Project Progress

University of Hawaii (UH) NAI–funded preparations for July field work at several sites in Iceland are underway. These activities will be coordinated with the 2004 Bioastronomy meeting in Reykjavik . The goal is to collect glacial melt water, sediment, and sub–aerial lake samples that will serve as the additional basis for a second hot–water drilling program to sample subglacial lakes in Iceland in 2005. The results of the first expedition, which is the first report of a viable subglacial lake (microbial) community, are in press in *Astrobiology* and will be presented as a poster at the Bioastronomy meeting. The July, 2004, field work will be conducted with Thorsteinn Thorsteinsson, UH NAI collaborator, and concentrate on sampling glacial streams and emerging glacial sediments at the northern and western margin of the Vatnajokull ice cap. We will also reconnoiter the geothermal area of Kverkfjoll, one of three proposed drilling sites for investigating subglacial water bodies. Finally, we plan to sample a large number of Icelandic subaerial lakes to construct a geochemical and microbial database with which to compare current and future subglacial data. Preparations at UH have included purchase of a moderate–volume centrifuge for microbiology work and various sampling supplies (e.g., pumps, filters).

Ms. Mary Miller (U.S. Army and Embry–Riddle University) is working as a volunteer in the Gaidos lab on isolating cyanobacteria from calcareous mats in a Mount Saint Helens hot spring. Miller participated in the sampling field work in September, 2003, and fulfilled her independent project requirement for her degree at Embry–Riddle. She presented preliminary results at the March, 2004, general Astrobiolgy meeting at NASA Ames. She is currently investigating aspects of co–culturing different cyanobacteria.

Mr. Nick Moskovitz, a graduate student at the Institute for Astronomy, will be working with Gaidos starting in the fall of 2004, on projects involving the extreme ultraviolet spectra of young stars, and light curve signatures of habitable planets.

Figure 1. Grimsvotn subglacial volcano on the Vatnajokull ice cap. Photo courtesy of Oddur Sigurdsson.

Highlights

- UH NAI–funded preparations for July field work at several sites in Iceland are underway to collect glacial melt water, sediment, and sub–aerial lake samples which will serve as the basis for a hot–water drilling program in Iceland in 2005.
- A program of student involvement in UH NAI research projects has begun, and students Mary Miller and Nick Moskovitz are working on projects involving culturing cyanobacteria and the light curves of habitable planets, respectively.

Roadmap Objectives

- ***Objective No. 1.2:*** Indirect and direct astronomical observations of extrasolar habitable planets
- ***Objective No. 5.3:*** Biochemical adaptation to extreme environments
- ***Objective No. 7.2:*** Biosignatures to be sought in nearby planetary systems

Field Expeditions

Field Trip Name: Iceland Subglacial Sampling

Start Date: July 17, 2004	***End Date:*** July 24, 2004
Continent: Iceland	***Country:*** Iceland
State/Province:	***Nearest City/Town:*** Vik
Latitude: 64.65 N	***Longitude:*** 16.72 W
Name of site(cave, mine, e.g.): Glacier	***Keywords:*** glacier, meltwater, microbial database

Description of Work: We will concentrate on sampling glacial streams and emerging glacial sediments at the northern and western margin of the Vatnajokull ice cap. We will also reconnoiter the geothermal area of Kverkfjoll, one of three proposed drilling sites for investigating subglacial water bodies.

Members Involved:
Thorsteinn Thorsteinsson
Eric Gaidos